SPECTROSCOPIA MOLECULAR

UN PERIODICO MENSUAL DE NOVAS E INFORMATIONES DE INTERESSE E VALOR AL SPECTROSCOPISTAS MOLECULAR

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SPECTROSCOPIA MOLECULAR ha essite redigite e publicate mensualmente depost Maio 1952 per Prof. Forrest F. Cleveland del Departimento de Physica del Instituto Technologic de Illinois in Chicago. Pro assecurar un plus facile lectura per le plus grande numero del spectroscopistas, le periodico es scribite in le lingua international, Interlingua. Manuscriptos e novas e informationes, tanto como abonamentos e ordines pro monographias, debe esser inviate a

Spectroscopia Molecular
Instituto Technologic de Illinois
Chicago 16, Illinois
Statos Unite de America.

Le texto original es legite per Dr. Alexander Gode, Chef del Division de Interlingua de Science Service (80 East 11th St., New York 3, N. Y., S.U.A.). Libros super Interlingua, disponibile ab ille adresse, es Interlingua-English Dictionary, Interlingua Grammar, Interlingua A Prime Vista, Interlingua in 20 Lektionen, Interlingua en 20 Leçons, Interlingua in 20 Lezioni, e Homo Sonetticus Moorensis (un bellemente imprimite parve libro de poemas con illustrationes).

Labor editorial es gratis. Le costo de preparation e distribution es recipite ab spectroscopistas, bibliothecas, e companias que beneficia del existentia de Spectroscopia Molecular. Il ha nulle altere medios de supporto. Omne le receptas es usate pro le mantenimento e melioration del periodico.

Assistentes de publication es Srta. Ruth Grining e Srs. Jerome M. Dowling e Edward A. Piotrowski. Le imprimer es facite per Tom Wilson e per Jean, Lilly, Chicki, e Alice del Servicios de Bureau al Instituto Technologic de Illinois sub le direction de Srta. Virginia Brown.

Il ha 12 numeros per anno e le precio de abonamento es $2.00 nette, franc de posta. Volumines passate del annos 1952, 1953, 1954, e 1955 es $3.00 nette per cata un, franc de posta. Numeros individual es $0.25 pro cata un, franc de posta. Le periodico pote esser inviate per posta aeree si le subscriptor provide le costo de postar additional. (Face cheques pagabile a Spectroscopia Molecular.)

Companias pote attachar un pagina de informationes in re lor productos, si illos es de interesse a spectroscopistas molecular.

MONOGRAPHIAS. Duo monographias es disponibile. Illos es:

Spectros Molecular. I. Regulas de Selection pro Spectros Vibrational de Moleculas Polyatomic, per Forrest F. Cleveland, 1953, 25 paginas, $0.75 nette.

Spectros Molecular. II. Tractamentos del Coordinatas Normal de Moleculas Polyatomic, per Salvador M. Ferigle e Alfons Weber, 1955, 30 paginas, $1.00 nette.

SPECTROSCOPIA MOLECULAR

Un bulletin mensual de novas e informationes de interesse e valor al spectroscopistas molecular

Volumine 5 | Julio 1956 | Numero 51

UNIVERSITATE FISK ORGANISA SU 7ME INSTITUTO DE SPECTROSCOPIA ANNUAL

LE 7ME INSTITUTO de spectroscopia infrarubie annual va esser tenite ab le 27 al 31 de augusto al Universitate Fisk. Iste institutos servi pro introducer al chimistas, biologos, physicos, e ingenieros le uso del spectroscopia infrarubie in recerca industrial e in le recerca e inseniamento academic.

Le facultate (nondum complete) va includer:

DR. MARIE-LOUISE JOSIEN, Universitate Bordeaux, Francia;

DRS. K. KEITH INNES e ERNEST JONES, Universitate Vanderbilt;

DR. JAMES R. LAWSON, Universitate Statal Agricole e Industrial de Tennessee;

DR. NELSON FUSON, Universitate Fisk.

Discursos introductori va esser tenite in le matinos, sessiones laboratorial in le postmeridies, e discursos super themas plus avantiate e specialisate in le vesperes. Disponibile essera un varietate de spectrometros commercial.

Participantes habera opportunitates pro discuter lor problemes con le membros del facultate.

(Nelson Fuson, Universitate Fisk, Nashville 8, Tennessee, S.U.A.)

* * *

ROBERT S. MULLIKEN del Universitate Chicago ha essite eligite Fellow honorari in le Societate Chimic (London).

EFFECTOS INTERMOLECULAR IN LE SPECTROSCOPIA INFRARUBIE VA ESSER DISCUTITE

LE 2NDE CONFERENTIA de Recerca Gordon super le spectroscopia infrarubie, organisate per le Association American pro le Avantiamento de Scientia, essera tenite ab le 20 al 24 de augusto al Academia Kimball Union (Meriden, New Hampshire, S.U.A.).

Le thema del assemblea essera "Effectos Intermolecular in le Spectroscopia Infrarubie". Il ha sessiones super le theoria general, gases, liquidos e solutiones, solidos, e effectos intermolecular in le analyse chimic per uso del spectro infrarubie.

Inter le participantes es:

L. J. BELLAMY, C. G. CANNON, J. W. LINNETT, N. SHEPPARD, e G. R. WILKINSON de Anglaterra;

J. LECOMTE, H. LENORMANT, e B. VODAR de Francia;

J. VAN KRANENDONK e W. VEDDER de Hollanda;

H. H. GUNTHARD de Switza;

R. MECKE de Germania; e

S. MIZUSHIMA de Japon.

(E. R. Blout, Corporation Polaroid, 730 Main St., Cambridge 39, Mass., S.U.A.)

* * *

BRYCE L. CRAWFORD, JR. del Universitate Minnesota e CHARLES H. TOWNES del Uni-

(continuate al pagina 35)

VOS POTE EMER le tempore de un homine, vos pote emer le presentia physic de un homine a un date placia; vos etiam pote emer un numero mesurate de motiones muscular habile per hora o per die. Sed vos non pote emer le enthusiasmo; vos non pote emer le initiativa; vos non pote emer le loyalitate; vos non pote emer le devotion de cordes, mentes, e animas. Vos debe ganiar iste cosas ... .

-- CLARENCE FRANCIS.

LE PRESENTE STATO DEL INVESTIGATION DE TRANSITIONES PROHIBITE IN LE SPECTROS INFRARUBIE DE MEDIOS DENSE

J. F a h r e n f o r t

Laboratorio pro Chimia General e Inorganic
Universitate Amsterdam, Amsterdam, Hollanda

(Recipite le 16 de januario 1956)

LE OBSERVATION de transitiones prohibite in le spectros infrarubie vibrational rotational de gases comprimite e de liquidos ha aperite un nove campo de recerca super le interactiones intermolecular.

* * *

Collisiones binari

QUANDO nos recognosce que le intensitate del bandas inducite, observate in gases pur comprimite, es proportional al quadrato del densitate del gas absorbente, il es obvie que le apparentia del transitiones prohibite es un consequentia del perturbationes mutue de moleculas in collisiones binari. Iste perturbationes es supponitemente presente in le forma de fortias de excambio o fortias electrostatic le quales ha le effecto de inducer un momento de dipolo in le pares de collision. In general, un tal momento de dipolo inducite depende de omne le coordinatas normal de ambe moleculas. Consequentemente, illo fluctua con le frequentia de omne le vibrationes molecular e lor combinationes, includente ille combinationes in le quales ambe moleculas participa.

Absorption inducite es in le majoritate del casos observabile solmente quando le vibration correspondente del molecula imperturbate non imparti un momento de dipolo fluctuante, i. e. quando le vibration es prohibite in le infrarubio.

Le vibrationes prohibite es activate per le pression

LE ACTIVATION per le pression del vibrationes prohibite, e le fundamentales e le harmonicos, ha nunc essite observate in casos numerose. Istos include le fundamental e harmonicos de H_2[1-7], O_2,N_2[8,9,10], CO_2[6,11,12], e C_2H_2[13].

---

[1] H. L. Welsh, M. F. Crawford, J. C. F. MacDonald, e D. A. Chisholm, Phys. Rev. 83, 1264 (1951).

[2] D. A. Chisholm, J. C. F. MacDonald, M. F. Crawford, e H. L. Welsh, Phys. Rev. 88, 957 (1952).

[3] D. A. Chisholm e H. L. Welsh, Can. J. Phys. 32, 291 (1954).

[4] E. J. Allin, W. F. J. Hare, e R. E. MacDonald, Phys. Rev. 98, 554 (1955).

[5] D. A. Chisholm, W. F. J. Hare, e H. L. Welsh, J. Phys. 15, 511 (1954).

[6] M. F. Crawford, H. L. Welsh, e J. L. Locke, Phys. Rev. 76, 580 (1949).

[7] M. F. Crawford, H. L. Welsh, J. C. F. MacDonald, e J. C. Locke, Phys. Rev. 80, 469 (1950).

[8] M. F. Crawford, H. L. Welsh, e J. L. Locke, Phys. Rev. 75, 1607 (1949).

[9] M. L. Oxholm e D. Williams, Phys. Rev. 76, 151 (1949).

[10] A. L. Smith, W. E. Keller, e H. L. Johnston, Phys. Rev. 79, 728 (1950).

[11] J. Fahrenfort, H. de Kluiver, e T. P. J. H. Babeliowsky, J. de Phys. Radium, 15, 617 (1954).

[12] J. Fahrenfort, Dissertation, Amsterdam, 1955.

[13] S. Minomura, Revs. Phys. Chem. Japan, 24, 49 (1954).

[14] J. A. A. Ketelaar, J. P. Colpa, e F. N. Hooge, J. Chem. Phys. 23, 413 (1955).

Transitiones inducite de rotation pur de H_2 ha essite investigate per Ketelaar, Colpa, e Hooge[14].

Transitiones simultanee

PROQUE, inter le combinationes del vibrationes molecular de un par de collision, il ha un categoria que include vibrationes combinate de ambe moleculas, nos debe expectar le apparentia de bandas inducite de combination pro le quales ambe moleculas de un par de collision face un transition simultaneemente. In iste processo, le par de collision absorbe un quanto que equala le summa del quantos acceptate per le moleculas componente. In substantias pur, tal transitiones simultanee es trovate solmente in le vicinitate immediate del frequentias de combination del moleculas componente e assi es difficile a distinguer inambiguemente[1].

Primo establite in 1955

LE PHENOMENO de transitiones simultanee esseva primo establite foris de dubita per le autor[12,15]. In mixturas de CO_2 e

---

[15] J. Fahrenfort e J. A. A. Ketelaar, J. Chem. Phys. 22, 1631 (1954).

H_2, O_2, o N_2, ille trovava bandas de absorption pronunciate a

$$\nu_3(CO_2) + \nu(H_2) = 6509 \text{ cm}^{-1},$$

$$\nu_3(CO_2) + \nu(O_2) = 3903 \text{ cm}^{-1},$$

$$\nu_3(CO_2) + \nu(N_2) = 4670 \text{ cm}^{-1}, \text{ e}$$

$$\nu_2(CO_2) + \nu(N_2) = 2996 \text{ cm}^{-1}.$$

Tosto postea Coulon, Robin, e Vodar[16]

---

[16] R. Coulon, J. Robin, e B. Vodar, Compt. rend. 240, 1072 (1955).

---

trovava le transition simultanee

$$\nu(HCl) + \nu(H_2) = 7041 \text{ cm}^{-1}.$$

Es trovate etiam in liquidos

KETELAAR E HOOGE[17] demonstrava que in

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[17] J. A. A. Ketelaar e F. N. Hooge, J. Chem. Phys. 23, 749 (1955); 23, 1548 (1955).

---

mixturas liquide de CS_2 con Br_2 o I_2 combinationes simultanee de summa tanto como differentia es observate, durante que in mixturas de CS_2 con S_2Cl_2, PBr_3, PCl_3, $SOCl_3$, CCl_3SCl, o $PSCl_3$ un spectro integre de transitiones simultanee esseva obtenite -- le qual es in parallelismo con le spectro Raman.

Un tal spectro pote esser usabile in le investigation de substantias fortemente colorate del quales nulle spectro Raman pote esser obtenite.

. . . NOVAS . . . . .

versitate Columbia ha essite eligite membros del statounitese Academia National de Scientias. Etiam K. S. KRISHNAN, Chef del Laboratorio National de Physica a Nove Delhi in India, esseva eligite associato estranie.

* * *

WALTER F. EDGELL (Universitate Purdue) e JOSEPH W. STRALEY (Universitate North Carolina) ha recipite subventiones Gugenheim pro le sequente anno academic.

* * *

S. BHAGAVANTAM, Vice-Cancellero del Universitate Osmania a Hyderabad in India, visitava le laboratorios de spectroscopia al Universitate Chicago e al Instituto Technologic de Illinois le 4 e 5 de maio.

* * *

VAN ZANDT WILLIAMS es le gerente general del novemente formate Division de Instrumentos al Corporation Perkin-Elmer a Norwalk in Connecticut, S.U.A.

* * *

SPECTROSCOPIA INFRARUBIE PRO CHIMISTAS esseva le nomine de un curso date in le primavera per le departimento de extension del Universitate California a Berkeley.

(continuate al pagina 36)

SPECTROS RAMAN DE SOLUTIONES IN AMMONIACO LIQUIDE

K o y o A i d a

Le Instituto de Recerca Chimic de Solutiones Non-Aquee
Universitate Tohoku, Sendai, Japon

(Recipite le 20 de martio 1956)

LE SPECTRO RAMAN provide un del parve numero de methodos pro le studio de solutiones in ammoniaco. Cambiamentos appreciabile in le spectro occurre quando le substantia es dissolvite in iste liquide.

Ammoniaco es un bon solvente

COMO ES BEN-COGNOSCITE, ammoniaco liquide -- simile al aqua -- es un bon solvente e su solutiones es interessante proque le atomo N in NH_3 ha un singule par de electrones. Nonobstante, il ha solmente un parve numero de methodos pro investigar tal solutiones proque le pression de vapor de NH_3 a temperaturas ordinari es circa 8,5 kg cm^{-2}.

Un de iste methodos es le spectro Raman.

Cambiamentos occurre in le spectro

LE SUBSTANTIA que es miscite con le NH_3 liquide pare esser grandemente affectate per isto. In effecto, quando CCl_4 es miscite con NH_3 liquide, le vibration ν_3 es affectate e le intensitates del lineas del dupletto de resonantia Fermi es cambiate.

Como un altere exemplo, quando CH_3OH es miscite con NH_3 liquide, le vibration de tender C-H, le vibration de tender C-O, e le vibration de flexion C-O-H es cambiate. Le linea Raman C-H decresceva circa 20 cm^{-1}, durante que le numero de unda del linea C-O accreseva circa 7 cm^{-1}.

Iste factos monstra le grande interaction inter le NH_3 liquide e le CH_3OH, le qual es causate per le singule par de electrones del atomo N e le gruppo O-H del alcohol.

Le hydrochlorido de methylamino

AL PRESENTE, le hydrochlorido de methylamino es investigate. Nove lineas Raman appare quando isto es dissolvite in NH_3 liquide. Per exemplo, il ha un linea a 1030 cm^{-1} in addition al linea a 1000 cm^{-1}, e altere nove lineas tal como 2900 e 3022 cm^{-1}.

Quando NH_4Cl es addite al solution in NH_3 liquide, iste nove lineas practicamente dispare, o al minus deveni plus debile. Iste facto pote esser explicate per assumer le equilibrio

$$CH_3NH_2 \cdot HCl + NH_3 \rightleftarrows CH_3NH_2 + NH_4Cl.$$

Per exemplo, le linea a 1000 cm^{-1} debe originar se con le amino libere, durante que le linea a 1030 cm^{-1} debe originar con le forma de hydrochlorido. oOo

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. . . NOVAS . . . . .

SUBVENTIONES POSTDOCTORAL in spectroscopia es disponibile al Instituto Rice a Houston in Texas. Un comencia in septembre 1956, le altere in maio 1957. Le stipendio es $4500 per anno.

Recerca spectroscopic ha essite concentrate in le region microundic. Un spectrometro microundic es in operation e problemas in le structura molecular, radicales libere stabile, copular quadrupolic, e torsion interne es sub investigation, o es contemplate. Facili-

(continuate al pagina 37)

SPECTROS VIBRATIONAL DE SF_4

R. E. Dodd
King's College, Newcastle/Tyne
e
L. A. Woodward e H. L. Roberts
Laboratorio de Chimia Inorganic
Universitate Oxford
Anglaterra

(Recipite le 8 de maio 1956)

LE SPECTROS Raman e infrarubie de SF_4 ha essite mesurate e interpretate in terminos del symmetria C_{2v}. Le symmetria C_{3v} e structuras plus symmetric es excludite.

Isto es un altere exemplo (compara con SeF_4, $TeCl_4$, ClF_3, e ICl_2^-) de un molecula con 10 electrones de valentia cuje structura es derivate ex le configuration de bipyramido trigonal. Le pares de electrones non tenite in commun occupa positiones equatorial plus tosto que polar.

Plus detalios va apparer in Trans. Faraday Soc. Isto nunc es in pressa.

. . . NOVAS . . . . .

tates limitate etiam es disponibile pro recerca infrarubie.

(G. R. Bird, Departimento de Chimia.)

* * *

BAIRD ASSOCIATES, INC. va combinar se le 1 de junio 1956 con le Compania Atomic Instrument. Le firma resultante essera appellate le Compania Baird Associates-Atomic Instrument.

* * *

UN INDICE DE CARTAS DE SPECTROS INFRARUBIE, consistente de 2038 cartas, nunc es disponibile a $25.50. Isto es le 2nde supplemento al indice complete, le qual consiste de 10969 cartas e ha un precio de $137.50.

(American Society for Testing Materials, 1916 Race St., Philadelphia, Pa.)

* * *

SECUNDO NOVAS DE INTERLINGUA (P. O. Box 1275, New York 17);

1) Le firma Miles-Samuelson, Inc.(1239 Broadway, New York 1), que specialisa in le preparation e production de documentos technologic e scientific, ha recentemente extendite su servicios a includer traductiones ab e in varie linguas, includente interlingua.

2) Le 6te congresso del Societate International de Hematologia (Boston, septembre 1956) va haber como linguas official: anglese, francese, espaniol, e interlingua.

3) Le Grammatica de Interlingua per Gode e Blair ha essite publicate in un 2nde edition, con solmente minor cambiamentos. Le 1me edition esseva exhauste.

* * *

SECUNDO LE CURRERO DEL MUNDO (le organo

SPECTRO INFRARUBIE DEL OXYDO DE TRIMETHYLAMINO

Paul A. Giguère e K. B. Harvey

Departimento de Chimia
Universitate Laval, Quebec, Canada

(Recipite le 11 de maio 1956)

IN UN RECENTE investigation del spectro infrarubie del oxydo de trimethylamino (le solido miscite con Nujol), le frequentia de tension N-O (943 cm^{-1}) esseva trovate como proxime al valor in hydroxylamino (926 cm^{-1}). Le assignation esseva facite per un comparation del spectro con illo de trimethylamino.

Assi, le si-appellate ligamine covalente co-ordinate ha proximemente le mesme longitude e constante de fortia como le correspondente ligamine covalente normal. Isto verifica le conclusion de Pauling[1].

Le presente resultato concorda con illos del spectros Raman[2] e del studios del diffraction electronic[3].

---

[1] Pauling, Le Natura del Ligamine Chimic.

[2] Goubeau e Fromme, Zeit, anorg. Chem. B58, 18 (1949).

[3] Rundle e Shomaker, citate per Allen e Sutton, Acta Cryst. 3, 46 (1950).

. . . NOVAS . . . . .

official del "Union Mundial pro Interlingua", Andre Schild, Leonhardstrasse 23, Basel, Switza), un curso elementari de interlingua per correspondentia es disponibile ab Ronald Spathaky, Beechecote 7, Portadown, Irlanda del Nord, a un costo de 5 shillings. Il ha 10 lectiones, con exercitios, e le explicationes es in anglese.

* * *

SPECTROSCOPIA ES DE USO in le analyse de grassias e oleos, secundo un breve articulo in le Aminco Laboratory News, Vol. 13, No. 3, maio 1956, p. 3 (American Instrument Co., 8039 Georgia Ave., Silver Spring, Md., S.U.A.). Vide etiam J. Am. Oil Chemist's Society, novembre 1955 e januario 1956.

* * *

LE SYMPOSIO SUPER VALENTIA E LIGAR CHIMIC al Universitate Wisconsin in junio includeva le sequente discursos:

M e r c u r i d i

HENRY EYRING, Valentia in le complexo activate;

ROBERT S. MULLIKEN, Alicun pensatas in re le comprehension del ligar chimic;

PER OLOV LOWDIN, Le natura quanto-mechanic del ligamine chimic;

VIRGINIA F. GRIFFING, Recente avantiamentos in le application del theoria de orbitales molecular a atomos e moleculas;

RICHARD A. BUCKINGHAM, Moleculas que es quasi sphericamente symmetric;

WILLIAM T. SIMPSON, Modellos simplificate in le quanto-mechanica molecular;

J o v e d i

JOHN R. PLATT, Densitates electronic e ligamines chimic;

PAUL C. CROSS, Alicun methodos pro le analyse del structura fin rotational;

E. BRIGHT WILSON, JR., Le structura e le barrieras contra le rotation interne pro alicun moleculas que contine gruppos de methylo;

WILLIAM N. LIPSCOMB, JR., Le structura del hydridos de boro;

WILLIAM W. BEEMAN, Structura molecular ex le margines de absorption de radios X;

S. I. WEISSMAN, Resonantia de spin electronic;

SIMON H. BAUER, Le ordine de ligamine in compositos BX_3 como deducite ex le distantias interatomic e le energias ligaminic;

V e n e r d i

GEORGE GLOCKLER, Energias e distantias ligaminic;

J. L. FRANKLIN, F. H. FIELDS, Energia de formation de moleculas e radicales libere ex le potentiales de apparentia a massa spectroscopic;

JOHN L. MARGRAVE, Structura de compositos gasose de boro ex le datos a alte temperaturas e le datos de massa spectroscopic;

MICHAEL SZWARC, Le natura del ligamines inter radicales e hydrocarburas aromatic;

(Va continuar in le sequente numero)

CALENDARIO

**JULIO 12-14. 7me Symposio International Astrophysic super moleculas in regiones cosmic. Liege, Belgica. (H. C. Urey, Instituto de Studias Nucleari, Universitate Chicago, Chicago 37, Ill.)

**AUGUSTO 6-17. Curso de spectroscopia infrarubie. Cambridge, Mass. (R. C. Lord, Laboratorio de Spectroscopia, Instituto Technologic de Massachusetts, Cambridge 39, Mass., S. U. A.)

**AUGUSTO 18-25. Un schola de estate super le applicationes del spectroscopia a problemas chimic, a fortias intermolecular, e al proprietates de fluidos. Cambridge, Anglaterra. (Departimento de Chimia Physic, Universitate, Cambridge, Anglaterra.)

**AUGUSTO 20-24. Conferentia de Recerca Gordon super le spectroscopia infrarubie. Academia Kimball Union. (E. R. Blout, Corporation Polaroid, 730 Main St., Cambridge 39, Mass., S.U.A.)

**AUGUSTO 27-31. Instituto de Spectroscopia Infrarubie. Nashville, Tennessee. (N. Fuson, Universitate Fisk, Nashville 8, Tenn., S.U.A.) oOo

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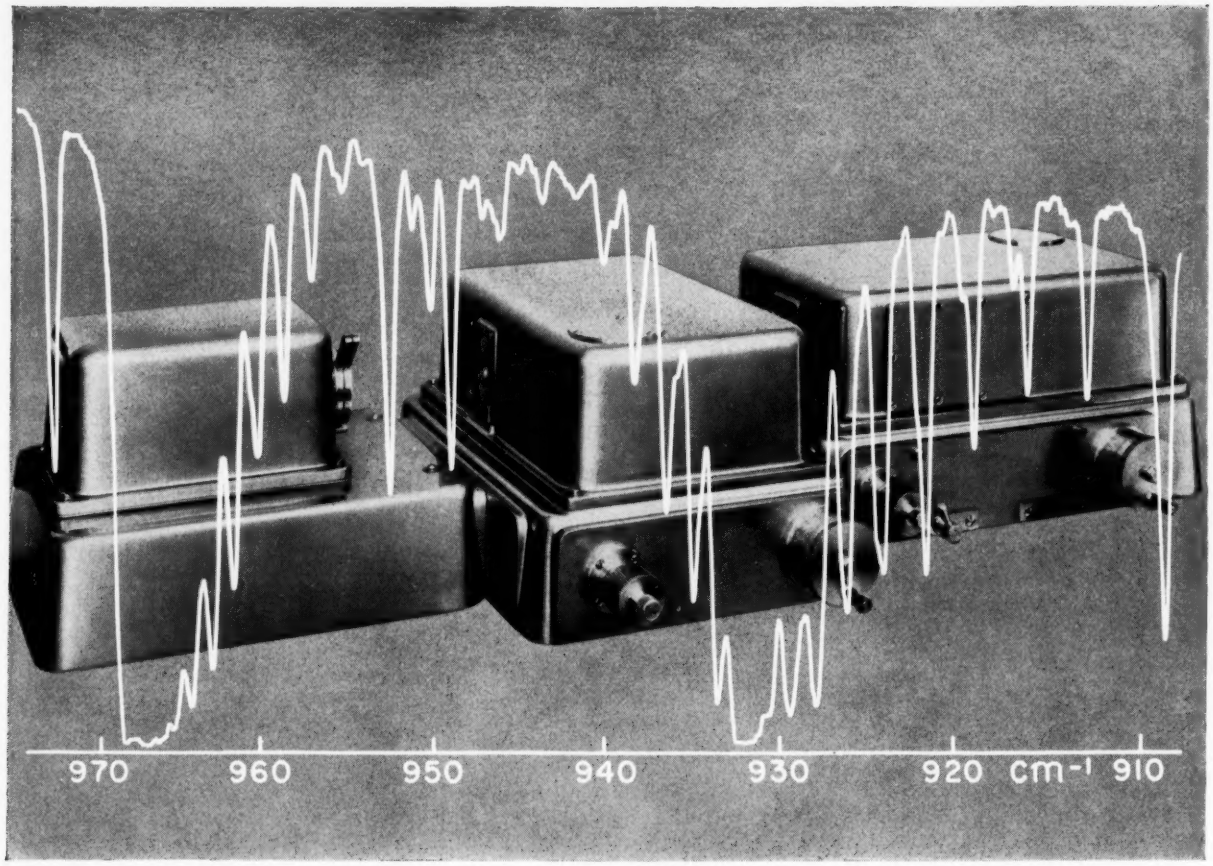

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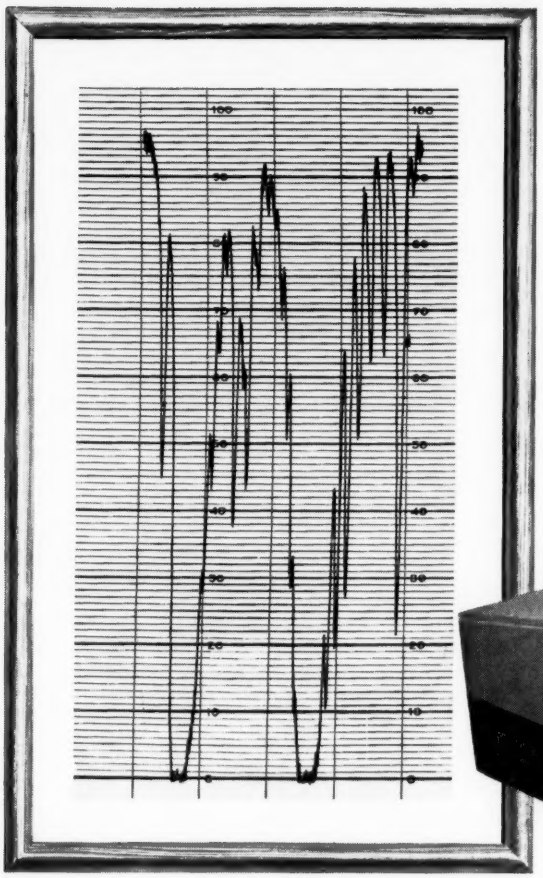

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